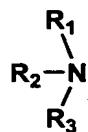


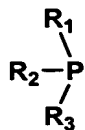
## CLAIMS

1. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin in the presence of a catalyst comprised of titanium halide and the organic aluminum represented by Formula  $R_nAlX_{3-n}$  (wherein  $1 < n \leq 2$ , R represents a hydrocarbon group, and X represents a halogen atom).
2. An Optical Resin Lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin employing a catalyst comprised of titanium halide and the organic aluminum represented by Formula  $R_nAlX_{3-n}$  (wherein  $1 < n \leq 2$ , R represents a hydrocarbon group, and X represents a halogen atom) and a process which hydrogenates said polyolefin.
3. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin employing a catalyst comprised of a mixture of A) a solid powder material which is prepared in such a way that the entire compound which is prepared by allowing (a) a low valence eutectic which is prepared by reducing titanium halide or a mixture of titanium halide and vanadium halide to contact with (b) at least one selected from the compounds represented by the following Formulas (I) - (III), or at least one selected from the compounds represented by the following Formulas (I) - (III) and an organic aluminum compound is fed, blended and pulverized, and B) an organic aluminum compound.

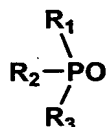
Formula (I)



Formula (II)



Formula (III)

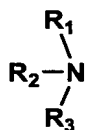


In above Formulas (I) - (III),  $R_1$ ,  $R_2$ , and  $R_3$  each represents a hydrogen atom, a hydrocarbon group, an alkoxy group, an amino group, a substituted amino group, an aminoalkyl group, or a substituted aminoalkyl group, and each of  $R_1$  or  $R_2$ , and  $R_3$  may be combined to form a ring.

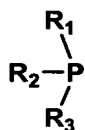
4. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin employing a catalyst comprised of a mixture of A) a solid powder material which is prepared in such a way that the entire compound which is prepared by allowing (a) a low valence eutectic which is prepared by reducing titanium halide or a mixture of titanium halide and vanadium halide to contact with (b) at least one selected from the compounds represented by the following Formulas (I) - (III), or at least one selected from the compounds

represented by the following Formulas (I) - (III) and an organic aluminum compound is fed, blended and pulverized, and B) an organic aluminum compound, and a process which hydrogenates said polyolefin.

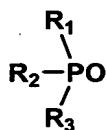
Formula (I)



Formula (II)



Formula (III)



In above Formulas (I) - (III),  $R_1$ ,  $R_2$ , and  $R_3$  each represents a hydrogen atom, a hydrocarbon group, an alkoxy group, an amino group, a substituted amino group, an aminoalkyl group, or a substituted aminoalkyl group, and each of  $R_1$  or  $R_2$ , and  $R_3$  may be combined to form a ring.

5. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin, in a catalyst system comprising (a) an organic aluminum compound, (b) a reaction product of a magnesium compound with titanium halide, and (c) a Lewis base, employing, as such a Lewis base, an aromatic carboxylic

acid ester ( $0 \leq (c)/(a) < 1/3$  (mol/mol) of alcohol having a secondary or tertiary carbon.

6. An optical resin lens comprising a polymer which is prepared via a production method including a process which prepares polyolefin via polymerizing olefin, in a catalyst system comprising (a) an organic aluminum compound, (b) a reaction product of a magnesium compound with titanium halide, and (c) a Lewis base, employing, as such a Lewis base, an aromatic carboxylic acid ester ( $0 \leq (c)/(a) < 1/3$  (mol/mol) of alcohol having a secondary or tertiary carbon, and a process which hydrogenates said polyolefin.

7. An optical resin lens comprising a polymer which is prepared via a production method comprising a process which polymerizes olefin, employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via a contact reaction of (a) an organic magnesium compound represented by Formula  $R_1MgOR_2$  (wherein  $R_1$  and  $R_2$  each represents an aliphatic or aromatic hydrocarbon group, and may be the same or different), (b) the halide represented by Formula  $R_3(n-m)MX_m$  (wherein  $M$  represents an element in Group 3B, 4B, or 5B in the periodic table,  $R_3$  represents an aliphatic or aromatic hydrocarbon group, and  $X$  represents a halogen atom, while  $n$  represents the valence of  $M$ , and  $m$  represents an integer of at least 1), and (c) titanium halide, and B) an organic aluminum compound.

8. An optical resin lens comprising a polymer which is prepared via a production method including a process to

prepare polyolefin by polymerizing olefin, employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via a contact reaction of (a) the organic magnesium compound represented by Formula  $R_1MgOR_2$  (wherein  $R_1$  and  $R_2$  each represents an aliphatic or aromatic hydrocarbon group, and may be the same or different), (b) the halide represented by Formula  $R_3(n-m)MX_m$  (wherein M represents an element in Group 3B, 4B, or 5B in the periodic table,  $R_3$  represents an aliphatic or aromatic hydrocarbon group, and X represents a halogen atom, while n represents the valence of M, and m represents an integer of at least 1), and (c) titanium halide, and B) an organic aluminum compound, and a process which hydrogenates said polyolefin.

9. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin, employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol or polysilanol compounds, (b) at least one of the compounds represented by Formula  $Mg(OR)_nX_{2-n}$  (wherein R represents a hydrocarbon group having 1 - 20 carbon atoms, X represents a halogen atom, and n represents an integer of  $0 < n \leq 2$ ), (c) at least one of titanium halides, and d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the relationship of  $0 \leq (d)/(b) < 0.2$  (mol/mol), and B) an organic aluminum compound.

10. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin to prepare polyolefin, employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol or polysilanol compounds, (b) at least one of the compounds represented by Formula  $Mg(OR)_nX_{2-n}$  (wherein R represents a hydrocarbon group having 1 - 20 carbon atoms, X represents a halogen atom, and n represents an integer of  $0 < n \leq 2$ , (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the relationship of  $0 \leq (d)/(b) < 0.2$  (mol/mol), and B) organic aluminum compound, and a process which hydrogenates said polyolefin.

11. An optical resin lens comprising a polymer which is prepared via a production method including a process which polymerizes olefin, employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol compounds, (b) at least one of the Grignard compounds, (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the condition of  $0 \leq (d)/(b) < 0.1$  (mol/mol), and B) an organic aluminum compound

12. An optical resin lens comprising a polymer which is prepared via a production method comprising a process which polymerizes olefin to prepare polyolefin, employing a catalyst system comprising A) a titanium- incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol compounds, (b) at least one of the Grignard compounds, (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the condition of  $0 \leq (d)/(b) < 0.1$  (mol/mol), and B) organic aluminum compound, and B) an organic aluminum compound, and a process which hydrogenates said polyolefin.

13. The optical resin lens described in any one of claims 1 - 12, wherein said olefin comprises a cyclic olefin.

14. The optical resin lens described in claim 13, wherein said olefin comprises a cyclic olefin and a non-cyclic olefin.

15. The optical resin lens described in any one of claims 1 - 14, wherein said olefin comprises a plasticizer or an antioxidant.

16. The optical resin lens described in any one of claims 1 - 15, which is employed in a pick-up device employing at least a blue laser beam.

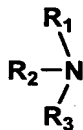
17. A production method of an optical resin material including a process to polymerize olefin employing a catalyst comprised of titanium halide and the organic aluminum represented by Formula  $R_nAlX_{3-n}$  (wherein  $1 < n \leq 2$ , R represents a hydrocarbon group, and X represents a halogen atom).

18. A production method of an optical resin material, which includes a process to polymerize olefin to prepare polyolefin employing a catalyst comprised of titanium halide and the organic aluminum represented by Formula  $R_nAlX_{3-n}$  (wherein  $1 < n \leq 2$ , R represents a hydrocarbon group, and X represents a halogen atom).

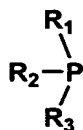
19. A production method of an optical resin material including a process to polymerize olefin employing a catalyst comprised of a mixture of A) a solid powder material which is prepared in such a way that the entire compound, which is prepared by allowing (a) a low valence eutectic which is prepared by reducing titanium halide or a mixture of titanium halide and vanadium halide to contact with (b) at least one selected from the compounds represented by the following Formulas (I) - (III), or at least one selected from the compounds represented by the following Formulas (I) - (III) and an organic aluminum compound, is fed, blended and pulverized, and B) an organic aluminum compound.



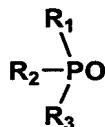
Formula (I)



Formula (II)



Formula (III)

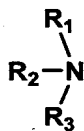


In the above Formulas (I) - (III),  $R_1$ ,  $R_2$ , and  $R_3$  each represents a hydrogen atom, a hydrocarbon group, an alkoxy group, an amino group, a substituted amino group, an aminoalkyl group, or a substituted aminoalkyl group, and each of  $R_1$  or  $R_2$  and  $R_3$  may be combined to form a ring.

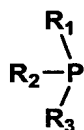
20. A production method of an optical resin material including a process to polymerize olefin to prepare polyolefin employing a catalyst comprised of a mixture of A) a solid powder material which is prepared in such a way that the entire compound which is prepared by allowing (a) a low valence eutectic which is prepared by reducing titanium halide or a mixture of titanium halide and vanadium halide to contact with (b) at least one selected from the compounds represented by the following Formulas (I) - (III), or at least one selected from the compounds represented by the

following Formulas (I) - (III) and an organic aluminum compound is fed, blended, and pulverized, and B) an organic aluminum compound, and a process which hydrogenates said polyolefin.

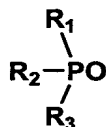
Formula (I)



Formula (II)



Formula (III)



In the above Formulas (I) - (III),  $R_1$ ,  $R_2$ , and  $R_3$  each represents a hydrogen atom, a hydrocarbon group, an alkoxy group, an amino group, a substituted amino group, an aminoalkyl group, or a substituted aminoalkyl group, and each of  $R_1$  or  $R_2$  and  $R_3$  may be combined to form a ring.

21. A production method of an optical resin material including a process to polymerize olefin in a catalyst system comprising (a) an organic aluminum compound, (b) a reaction product of a magnesium compound with titanium halide, and (c) a Lewis base, employing an aromatic carboxylic acid ester (0

$\leq (c)/(a) < 1/3$  (mol/mol) of alcohol having a secondary or tertiary carbon as said Lewis base.

22. A production method of an optical resin material including a process to polymerize olefin to prepare polyolefin employing, in a catalyst system comprising (a) an organic aluminum compound, (b) a reaction product of a magnesium compound with titanium halide, and (c) a Lewis base, an aromatic carboxylic acid ester ( $0 \leq (c)/(a) < 1/3$  (mol/mol) of alcohol having a secondary or tertiary carbon, as such a Lewis base, and a process which hydrogenates said polyolefin.

23. A production method of an optical resin material including a process to polymerize olefin employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via a contact reaction of (a) the organic magnesium compound represented by Formula  $R_1MgOR_2$  (wherein  $R_1$  and  $R_2$  each represents an aliphatic or aromatic hydrocarbon group, and may be the same or different), (b) the halide represented by Formula  $R_3(n-m)MX_m$  wherein M represents an element in Group 3B, 4B, or 5B in the periodic table,  $R_3$  represents an aliphatic or aromatic hydrocarbon group, and X represents a halogen atom, while n represents the valence of M, and m represents an integer of at least 1), (c) a titanium halide, as well as B) an organic aluminum compound.

24. A production method of an optical resin material including a process to polymerize olefin to prepare polyolefin employing a catalyst system comprising A) a

titanium-incorporating solid catalyst component which is prepared via a catalytic reaction of (a) the organic magnesium compound represented by Formula  $R_1MgOR_2$  (wherein  $R_1$  and  $R_2$  each represents an aliphatic or aromatic hydrocarbon group, and may be the same or different), (b) the halide represented by Formula  $R_3(n-m)MX_m$  wherein M represents an element in Group 3B, 4B, or 5B in the periodic table,  $R_3$  represents an aliphatic or aromatic hydrocarbon group, and X represents a halogen atom, while n represents the valence of M, and m represents an integer of at least 1), (c) a titanium halide, as well as B) an organic aluminum compound, and a process which hydrogenates said polyolefin.

25. A production method of an optical resin material including a process to polymerize olefin employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol compounds or polysilanol compounds, (b) at least one of the compounds represented by Formula  $Mg(OR)_nX_{2-n}$  (wherein R represents a hydrocarbon group having 1 - 20 carbon atoms, X represents a halogen atom, and n represents an integer of  $0 < n \leq 2$ ), (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the relationship of  $0 \leq (d)/(b) < 0.2$  (mol/mol), and B) an organic aluminum compound.

26. A production method of an optical resin material comprising a process to polymerize olefin to prepare

polyolefin employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol compounds or polysilanol compounds, (b) at least one of the compounds represented by Formula  $Mg(OR)_nX_{2-n}$  (wherein R represents a hydrocarbon group having 1 - 20 carbon atoms, X represents a halogen atom, and n represents an integer of  $0 < n \leq 2$ , (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the relationship of  $0 \leq (d)/(b) < 0.2$  (mol/mol), and B) an organic aluminum compound, and a process which hydrogenates said polyolefin.

27. A production method of an optical resin material including a process to polymerize olefin employing a catalyst system comprising A) a titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol compounds, (b) at least one of the Grignard compounds, (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the condition of  $0 \leq (d)/(b) < 0.1$  (mol/mol), and B) an organic aluminum compound.

28. A production method of an optical resin material comprising a process to polymerize olefin to prepare polyolefin employing a catalyst system comprising A) a

titanium-incorporating solid catalyst component which is prepared via the contact of (a) at least one of the silanol compounds, (b) at least one of the Grignard compounds, (c) at least one of titanium halides, and (d) at least one electron-donating compound selected from amine, carboxylic acid amide, phosphine, phosphoric acid ester, phosphoric acid amide, ketone, and carboxylic acid ester under the condition of  $0 \leq (d)/(b) < 0.1$  (mol/mol), and B) an organic aluminum compound, and a process which hydrogenate said polyolefin.

29. The production method of an optical resin material described in any one of claims 17 - 28, wherein said olefin comprises a cyclic olefin.

30. The production method of an optical resin material described in claim 29, wherein said olefin comprises a cyclic olefin and a non-cyclic olefin.

31. The production method of an optical resin material described in any one of claims 17 - 28, which includes a process which incorporates a plasticizer or an antioxidant in said polymer.